



ANALYTIC ANATOMY.

A LECTURE

INTRODUCTORY TO A COURSE

DELIVERED IN THE

PHILADELPHIA ANATOMICAL ROOMS.

SESSION OF 1823-4.

By JOHN D. GODMAN, M.D.

LECTURER ON ANATOMY AND PHYSIOLOGY.

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At a meeting of the class attending Dr. J. D. Godman's Course of Lectures on Anatomy, held 24th of January, 1824, Dr. Ruan was called to the chair, and James Cox appointed Secretary: The following Resolutions were unanimously adopted, viz.

Resolved, That a committee of four gentlemen be appointed to wait on Dr. Godman, and request for publication, a copy of his Introductory Lecture to the present course.

Resolved, That should this application be successful, the same committee be instructed to cause the lecture to be published in a pamphlet form. Wherefore, Thomas W. Meriwether, James Webster, jun. Nathaniel Tatem, and James Cox, were appointed to carry these resolutions into effect.

JOHN RUAN, Chairman

JAMES COX, Secretary.



ANALYTIC ANATOMY.

A LECTURE, &c.

THE spirit of improvement, so peculiarly distinctive of the present age, has extended with energy to the study of Anatomy, and given to our science a form and pressure almost entirely new. That which was formerly taught by stealth, mentioned with disgust or abhorrence as a sacrilegious violation of the tomb, and exposed the lives of its cultivators to danger, has attained a sublime elevation among the sciences, and is justly revered as the foundation of all that is really valuable in medicine. Yet from age to age we perceive it handed down in the condition it was left in by Galen, under the shadow of whose ponderous volumes it was dimly seen and incorrectly portrayed. It seemed as if the very dust which time had deposited on his pages, was too sacred to be lightly removed; and the hardy investigator who ventured to doubt his inspiration and veracity, was marked as profane, or shunned as if accursed. One person was at length found, whose eager and energetic mind was not to be satisfied with any thing short of the truth; who disdained to pin his faith on the mere assertions of others; who appealed from books to facts, from men to things, from dogmatism to nature. Vesalius of Brussels was the man who did this, and who merits the grateful remembrance of every student of Anatomy. He, by his knife, detected and exposed the rash conclusions and fallacies of Galen; who awakened the sleeping spirit of inquiry, and breathed a new life into the bosoms of those who studied Anatomy.

But we are not surprised to learn, that the first changes made in our seience were far distant from perfection. For very many years after the time of Vesalius, anatomy remained in a state of comparative rudeness and barbarism, presenting oceasional gleams of light, which were soon lost in the general surrounding darkness. As the temple of anatomy was only to be entered by the sepulehral gate, near which superstition long watched with trembling, though terrifie mien, her train of "dark imaginings," assisted in keeping inquisitive scrutiny aloof, until by the diffusion of intellectual light these phantoms were put to flight. Then the study of anatomy rose very rapidly in estimation, her votaries became numerous, and their researches of real utility, as they relinquished the vain disputations of (falsely called) philosophers, to seek for truth in the realities of nature.

Instead of offering you a minute detail of the progress of anatomical knowledge, I shall endeavour briefly to lay before you, a few remarks on the best method in which anatomy should be taught, and may be most readily and correctly acquired; prefaced by some observations relative to the excellence and importance of our subject, which cannot be too frequently repeated, or too deeply impressed on your minds.

When we behold an edifice which is conspicuous for the grace and beauty of its aspect, the richness of its materials, the exquisite skill of its arrangement, its adaptation to the comforts and convenience of the inhabitants, the whole impresses us with sentiments of wonder and delight! If we inspect it more closely, and discover that all this order and

elegance results from various combinations of heterogeneous materials; that what appears to us as a light and gracefully springing arch, is a mass of immense size, sustaining an enormous weight; that the smooth and polished surfaces were lately harsh and rugged stone, we pay involuntarily a tribute of respectful admiration to the art which is productive of so much comfort, pleasure and protection. But the most splendid exertions of human ingenuity fade into dim insignificance, when contrasted with the wondrous contexture of the human frame, where the simplest of tissues far outstrips the most boasted exertions of mechanical ingenuity; where the instruments are not only perfect in their kind, but endowed with a power, self-sustaining, self-acting, and self-continuing.

To bring these truths nearer to your minds, let us glance at the relations which subsist between the different parts of our body. We every where observe, that the nerves and blood-vessels are the great agents of sensation, nutrition, and life. Yet these have no independent existence; they are themselves supplied with nerves, blood-vessels and absorbents. Here, we are at once carried to the utmost limits of our comprehension, for in what an infinitely diminished series may not the nerves and blood-vessels exist, when they go to supply the vessels of vessels, and the nerves of nerves! Observe the manner in which the due balance of actions is maintained in our bodies; one set of vessels absorb and another deposit; one set accumulates and another removes. When this equilibrium is destroyed disease ensues, and, if it be not restored, death must succeed. This leads us at once to infer the true value of that knowledge, which enables us to understand the complex actions of our system, so that we may check their inordinateness or remedy their defects. In the organs of sense.

we find every thing that is wonderful in design, and admirable in execution. We behold Omnipotence in every product, and Omniscience in every plan. We see system within system, organ within organ, each differing from the other, performing different offices, all tending to the perfection of a common function; which itself is but a small part, contributed to the perfection of the general whole. With such views of the subject, we may be excused for exclaiming, "What a piece of work is man! How noble in reason! How infinite in faculties! In form and moving, how express and admirable! In action, how like an angel! In apprehension, how like a God!"

Let us next consider the importance of anatomy to the practitioner of medicine. He who is unacquainted with the structure and function of the healthy organs, must be, of necessity, inadequate to judge correctly of the causes and seats of disease. He will be continually forming incorrect and injudicious opinions, which lead at once to injurious or destructive practice. He is perpetually exposed to suffering or alarm, from symptoms and appearances which a knowledge of anatomy would at once make clear and intelligible. His conduct must always be marked by the worst of indecision, that springing from ignorance; while his reputation, ever left to the sport of accident, is continually in danger of being destroyed. In his daily business, he is without guiding principles, and destitute of support; he suffers all those vexations which result from a habit of ill-directed and desultory experiment. It is beyond contradiction, that such results must ensue, when men enter on the practice of our profession without having first learned the construction of the body on which they are to exercise their skill. It is a superficial and an untenable notion, that anatomy need be known THOROUGHLY, enly by the surgeon. There is no department of medicine which does not lean on it unremittingly for support. What are your drugs and medicines, without a knowledge of the parts to which they are to be applied? How can you know the manner in which the organs act on these substances, without knowing how the organs are constituted? In what way is a physician to frame his opinion on the cause or consequences of a disease, without a knowledge of the healthy action, which cannot be understood, if the structure and relation of parts be not first investigated.

If a student ever expects to exercise his talents to advantage, he must early employ himself in gaining a knowledge of the principles which are to direct his future practice. It is unfortunately too common, that improper notions or prejudices are adopted in the beginning, relative to the whole, or certain parts of his professional studies. Anatomy is considered dry and uninteresting-a perplexed mass of unmeaning and arbitrary names-a vast number of slightly connected minutiæ, too difficult to be generally understood, and too repugnant to the feelings ever to be much admired; having no very apparent relation of parts, and these too numerous to be thoroughly examined. If surgery is mentioned, the mangling saw and excruciating cautery, are the earliest associations. Instead of this, we should, with Galen, never mention anatomy without considering it as a magnificent hymn of praise to the Creatorwhere the wonders of Omnipotence are continually developed; by which a torch is lighted to guide us through the wildering mazes of disease, and the way made easy for the energetic application of reason to the removal of the ills flowing from a disarray of the instruments of life.

If anatomy is difficult, it is owing to the rubbish under which it has been buried; that it is unpleasant and unin-

viting, is owing to the manner in which it has been distorted and misrepresented; if the minutiæ seem disconnected, it is because they have been violently displaced; that the parts seem slightly related to the mass, is because the relations have been neglected. Anatomy is not dry, nor difficult, nor uninteresting; these are the incorrect ideas of those who have not duly appreciated; they are the faults of too many books. Similar erroneous notions have been entertained relative to surgery, which are now yielding to the light of knowledge.

In the surgeon, instead of a cold and unfeeling executioner, who delights in blood and groans, we should perceive a benevolent being applying his knowledge to the prevention of misery and deformity; ever ready to interpose for the relief of those, who by sudden accident have been brought into a state of suffering. A keen eye, a steady hand, and an unfeeling heart, were once thought to be the great essentials to the character of a good surgeon. But surgery is no longer engaged in the mutilation of limbs, or in merely mechanical arrangements. Anatomy has opened a new career to the surgeon, and imparted a new dignity to his exertions; his greatest excellence now consists in saving what formerly it was his chief praise to remove. To the surgeon, ANATOMY is as a POLAR STAR, a never-failing guide, a sure support under every trial, and a guard against every danger. From our science, he gains the knowledge which prepares him to meet every exigency, which may result from accident, and even after the most desperate injuries, enables him to hold death in abeyance. It is from anatomy, that he obtains the intrepid steadiness which conducts his knife, while his face is pale with intense anxiety for the safety of his patient. The confidence inspired by his anatomical knowledge, imparts the calmness and cool

ness with which he attends to the cases occurring while his country's eagle is screaming over the field of battle and blood. There, though anxious and sick at heart, stunned to deafness by the martial thunder; his soul wrung by the sight of those too dreadfully mangled to be aided, he is still able to operate with safety and advantage to his patient, because he is entirely familiar with the structure, and is at no loss to address himself to each particular injury. How different is the reverse of this picture; how terrible to behold a man ignorant of anatomy, pretending under such eircumstances, to minister to the wounded and bleeding. Such a picture is too painful for contemplation; though, unfortunately for humanity, it has been too frequently exhibited.

It is now proper to inquire, why so few persons, comparatively speaking, become good anatomists. Is it because the subject is in itself so extremely difficult as to deter the curious by its very aspect? Is it that the body is composed of materials so various, of parts so discordant, as to forbid any effort to disentangle their intricacies, or to arrange them harmoniously? Is the human intellect too obtuse to pereeive or remember the integrants of the mass so curiously eombined in our structure? Or may it not be owing to the improper medium through which the science is beheld, that so great a number mistake beauty for deformity, and so frequently turn away from the contemplation with repugnance or disgust. To the latter source I am inclined to attribute, the imperfect or incorrect ideas which multitudes entertain of anatomy. At the very threshold of the profession, they are presented with books, often as deficient in correctness, as they are wearisome and unpleasant in style. Books which would lead to the conclusion, that the human body is composed of parts, without relation;

of irregularities in structure, impossible to be considered under any general view; and these rendered still more repulsive, by the combination of barbarisms used to designate them Indeed, it has been but a few years, since the whole organization of the body was admitted to he possessed of life, and the very best of the books, until very lately, placed in the hands of beginners, were not free from the most puerile and pitiful conceits, worthy of that era of philosophy which resorted to the imagination for the removal of every difficulty. Thus the inexperienced were frequently prepared to remain ignorant, by the perplexed and inexplicable explanations of an author, who had probably made his hook, not from an investigation of the secrets of nature, hut by garbling and repeating the writings of others, as little acquainted with the subject as himself. The irksomeness of studying such books is so great, as to excite any thing but love for the science; and by the time that the student is ready to begin his investigations in practical anatoniy, his associations of difficulty and perplexity with the very name of the science, are too firmly fixed to be easily removed. He begins in hesitation, and advances without pleasure; he consults his books, and finds himself more thoroughly benighted; every effort he then makes plunges him more deeply in confusion, and if not properly assisted, he most commonly relinquishes the knife. in despair of ever being able to resume it with satisfaction.

Possibly, before his first attempts are made, he has witnessed the beautiful displays of the anatomical theatre, and is delighted with the elegance and simple character of the organs demonstrated. Inspired by hopes of rapid improvement in such desirable knowledge, he is impatient to lay bare the structures of the body with his own hand; thinking, with all the eagerness of youthful anticipation, of the

scientific acquisitions he is about to make. How great is his mortification to find on his first incision, that he can recognize nothing in the body which he has seen in the lecture room; he uncovers parts of which no mention was made; he sees peculiarities that were not presented before, and he is unable to imagine why it is, that the things which appeared but a few hours before so perfectly intelligible, should now set at defiance all his scrutiny, and chill all his enthusiasm.

When anatomy is seen as it really is, without the intervention of books, or the misrepresentations which may be made by the knife, the throng of difficulties disappear, the discord is reduced to harmony, and irregularity to order. The student looks in vain for the perplexity he expected, because this state does not exist in nature; yet he is sometimes fearful that his advances are not safe, because his progress is so easy. Such however is the inveteracy of habit and prejudice, that we occasionally see a dissector puzzled by discovering that the structure does not agree with the description, and unwilling to acknowledge that the book is not right, though fully convinced that nature cannot be wrong.

Anatomy is the science which should teach us' what exists in the body, and how every thing exists there—not how much may be effected by patience and diligence in severing parts which nature never intended to be disjoined, or reducing all her varied and admirable productions to an uniform appearance, by removing all the parts with which the teacher does not wish to be incommoded. This may be systematic, but it is prejudicial; it may be according to custom, but it is not in consonance with nature. It may display admirable skill and care; it may look beautifully; it may be described learnedly, and wisely, and well; yet.

after all, this is not ANATOMY; for the anatomy of the human body is the structure as fashioned and related by nature, not as sundered and exhibited by art.

The only safe mode of reasoning, is that which leads us back, from particular observations to general conclusions. When we wish to understand any substance in nature, we must first reduce it to simple elements, in order to gain a proper acquaintance with the result of their combination or the mass. This mode of examination is called analysis, or decomposition. If we re-combine the elements in order to re-produce the mass, the process is called synthesis, or composition. It must be clearly perceived, that the latter method can only be resorted to with advantage, after the analysis has been made with the most perfect correctness.

The mode in which anatomy is ordinarily taught is by SYNTHESIS, OF COMPOSITION. The parts, or elements, are laid before the student in a state of disintegration; a state in which they never exist in the human body, and the learner is to form such an acquaintance with these parts, as to be able afterwards to recompose the mass, by mentally combining them together. He is shewn bones with their processes and foramina; the continuation of a foramen through several bones, constitutes various and far distant demonstrations; then the muscles are exhibited separate from all the peculiarities and essentials of their relations; and the simple attachments of their extremities are the circumstances on which most stress is laid. The nerves, arteries, veins, and absorbents, are in like manner shown by themselves, and so perfectly insulated, that a person might without difficulty suppose that they were never to be found in company. It is not surprising that anatomy is difficult. when the mind is forced to understand it by continued ef forts of abstraction, in order to place in some sort of relation, parts which have only been seen at a distance from each other.

When you advance to the study of our science with a proper conviction of its value, aided by an experienced friend to direct your application, you will be delighted to find that the supposed difficulties are artificially made—you will perceive order and beauty where you may have expected irregularity and confusion. Each day's practice will render the succeeding more easy; and when you look back, you may smile to discover how unnecessarily fears have been excited. In examining the structures of various parts, and their relation to the general mass; the important functions they discharge in the healthy body, and their affections in a state of disease, you will forget the jargon in which you have seen them enveloped in books, and wonder that men could so relinquish the substance, to grasp at an illusive shadow. After the elements of this study have been acquired, and by a little patience the difficulties attached to every new pursuit mastered, you will feel as if in a new world-every part explored will bring to mind the importance of some medical precept, or establish in the mind the correctness of some surgical practice. You gradually become acquainted with the physiology of the system, and are better and better qualified to discover the insidious approaches of disease. You will be enabled to extend your researches relative to the operation of remedies, to scrutinize the validity of the doctrines taught you, and go out into the world prepared for all the incidents which may befal you in your career for professional usefulness or fame.

Let me now ask your attention, while I venture to lay before you a view of the distinctions to be drawn between General, Philosophical, and Surgical Anatomy.

General Anatomy, is a beautiful science which sprung from the vigorous mind of the illustrious Bichat, like Minerva from the head of Jove, armed at all points. In this part of our science, we have all the textures of the system viewed together, which are properly of the same kind, and consider them in relation to the distinctive characteristics they exhibit wherever they are found, and in whatever combinations they exist. It is by general anatomy that we are taught to view the cellular, nervous, sanguineous, and other systems abstracted from each other, and consider the great laws and principles to be deduced from the phenomena they exhibit, or from the experiments which have been made on them. This science is free from all details of particular configuration or relation, and may be considered as the firmest basis for correct and enlarged views of physiology and pathology.

PHILOSOPHICAL ANATOMY teaches us the parts of which the body is composed by a demonstration of their sensible properties, and by accurate definitions of their place and figure. It displays each part by itself, and makes a separation of the immediate subject of attention from all others: holds up to our view each instrument as a distinct exercise of the memory, and enables the physiologist by this careful display, to form accurate ideas of their individual uses. If it were possible in anatomy, as in some other studies, to proceed without referring to parts not yet defined, this method would make a deep and almost ineffaceable impression, from its distinctness and order. But as this cannot be, as the Philosophical Anatomist must ever and anon turn aside to explain or anticipate, the learner is fatigued by the multiplex detail, the ideas become confused and the mind fatigued by the continued efforts at abstraction

SURGICAL ANATOMY differs from both the former; it takes the body as nature formed it, and shews the relations which exist between the different portions. As it is the business of the surgeon to act instantaneously, so is it the business of the surgical anatomist to display the struc ture of the body in its relation of parts. He destroys nothing to exhibit what lies beneath-he makes no incision that is not to be seen-he separates no parts according to their functions—he can only exhibit them as they are. In this way he becomes accustomed to the natural connections, knows what he is to meet with at every successive incision, and is not surprised by the unexpected appearance of parts. By thus learning the natural and ordinary relations, he is best prepared to form accurate opinions as to the changes produced by disease on the different textures, and can also act more efficiently when he attempts their removal or cure. SURGICAL ANATOMY may with propriety be terined THE ANATOMY OF RELATION. It is indeed the only anatomy that can fix the instrument firmly in the hand of the surgeon, and give to his eye in the hour of mortal danger that steady lustre, which speaks of a prepared and dauntless intellect.

In consequence of a careful investigation of the modes of teaching anatomy, I have been induced to resort solely to the method of analysis of decomposition. The subject is placed before the learner untouched; the knife is not used to clear obstructions from the way of the teacher, previous to the lecture. The student sees the relation of parts—the anatomy, as it is left by the hand of nature: he observes the manner in which they are to be successively removed—he sees the situations and company with which they are always to be found, and perceives that in this mode of examination there are no difficulties to impede his pro-

gress but inattention or neglect. The body is decomposed by the knife in his sight, and he soon acquires a clearness of information on the connexion of parts existing in the living system, which enables him at any moment to recollect what is to be encountered in any portion of the frame. The physiology he learns does not consist of a collection of scraps and fragments relative to each part separated, but it is the whole that can be learned from the whole in combination. Should the teacher even be inadequate to the task of telling him ALL that is necessary, yet as the student sees the veritable anatomy for himself, his subsequent reading is always aided by recollecting the actual condition of the structure.

In fact, we believe no cause has acted more powerfully in retarding the advancement of the science of medicine, than the injudicious mode of teaching anatomy synthe-TICALLY. In this way, we can easily account for the limited and unphilosophical views of physiology and pathology, which have been given to the world. One teacher acquires a habit of paying an exclusive attention to the nerves, and all his views are nervous—another scrutinizes the arteries, and all the theories he forms are inflammatory; a third studies the veins, and congestions and engorgements are the nightmares that oppress him; a fourth pours over the absorbents, and he is in continual dread, lest the balance of the system should be destroyed; a fifth looks entirely to the muscles, and his mind can perceive nothing but alternations of laxity and tension, of tonic and clonic contractions, of debility and spasm!

Would it not be considered ridiculous, were an artificer to shew us in separate pieces, the parts of a very complicated machine, and tell us their names and the points by which they were attached, without exhibiting their connexions with the springs or wheels essential to their one ration, and without which they could be of no use? Is it probable we should ever form correct ideas of the structure or mode of action of a time-piece, if we devoted ourselves exclusively to the study of a single part of its composition. Yet ANATOMY is too often studied in this way, and the consequence of continuing in the same method will be, that ignorance will remain, and obscure or partial reasonings be prevalent. It would be better that anatomy were neglected entirely, than to be only studied thus. It would be far more useful to the surgeon or physician, to be acquainted with the relations of parts in the most general manner, than to be able to talk of the infinitesimal ramifications of vessels or nerves, without knowing their connexions and relations. Anatomy, to be useful to the profession, and beneficial to humanity, must be known as it is, and in the only manner in which the structure can ever naturally exist.

In teaching anatomy by the analytic method, the teacher has not so good an opportunity of making the parts look beautiful, as in other modes of investigation. He must of necessity shew the structure exactly as it is; and must be content with the advantages his class receives from correctly understanding the subject. While learning the relations of parts the class is in general too usefully and agreeably employed, to think of the sights they might have, were the lecturer at liberty to prepare them beforehand, at the trifling expense of destroying a few fascia, arteries, veins, nerves, tendons or muscles. It is true that in this mode of teaching, the lecturer will find it no easy task to have his lesson well committed to memory, and he may occasionally err in his descriptions; yet as he opens the faultless volume of nature before the eyes of his class.

an error in his speech does not place a veil over their sight; nor does an inaccuracy in his detail, produce any inaccuracy in their perceptions.

To such a study of anatomy in its simplest gaise, I now invite you, GENTLEMEN; and in giving this invitation, I do it with an entire confidence, that you will become satisfied of the truth of the opinions I have advanced, and assured by the evidence of your own senses, that this science is capable of affording you the highest gratification, not only by the excellence and inimitable perfection of the instruments used in our constitution, but by the admirable simplicity with which the different parts harmonize in the accomplishment of every action, and in the discharge of every function. If I am not much mistaken, you will be surprised to discover how easy it is to understand all that is known of anatomy, and how few are the real difficulties in your way.

In presenting myself for the purpose of offering you an opportunity of testing the merits of the method I have described, it is with a fuller experience of its excellence and utility; being more practised in the exercise of it, and more thoroughly enabled to rely on the strength and stability of that ardent enthusiasm which prompted my first effort. Nor would it be just to my feelings and character, were it supposed that no other motives than mere desire for subsistence, urge me to demonstrate the superiority of this mode of teaching anatomy. As the first person who ever attempted it in this country, and, as far as I can learn, in any other, it will be my glory to carry it nearer to perfection.* Let it be called vanity or pride that this

^{*} The finst course, according to the Analytic system, was de livered, March, 1821, at Philadelphia, in the building since altered into St. Stephens church, Tenth Street.

wish is expressed, still it must be made. It is impossible that a man who is impelled by a feeling irresistible, irrepressible, inextinguishable, inexhaustible, to do something excellent, should entirely fail. Doubtless you can appreciate these emotions; your own bosoms have swelled with those thrilling sensations, which are common to the honourably ambitious, and you can all acknowledge the truth of this observation, that,

"So strong the zeal to immortalize himself, Glows in the breast of man, that even a few, Few, transient years, won from the gulf abhorred Of blank oblivion, seem a glorious prize Though even to a clown!"

Note.—In a criticism on Dr. Antommarchi's anatomical plates, after treating of the different modes of studying anatomy, M. Dumerit makes the following remarks:

"Il y a une autre manière de disposer les faits pour les faire bien connaître, c'est en offrant à l'observation des objets dans l'ordre où ils se présentent naturellement lorsqu'ou les examine. Cette méthode, plus difficile à communiquer, est cependant beaucoup plus satisfaisante dans ses applications, car elle conduit plus directement au seul but qui fait surmonter les dégoûts inséparables dans les recherches anatomiques. Si elle n'a pas été adoptée jusqu'ici, c'est que pour transmettre la science par cette voie, il fallait trouver dans un même maître un habile préparateur, un savant déjà instruit par une autre méthode, qui, après avoir bien vu, bien observé, ait été doué du talent d'exprimer la nature avec le plus grand art, en la faisant parler fidèlement aux yeux."—Archives Generales de Medicine, Tome 2, Juin 1823. p. 311.

"There is another manner of disposing the facts to make them well known; it is, in offering the objects for observation, in the order they naturally present themselves, when they are examined. This method is more difficult to impart, nevertheless it is much more satisfactory in its applications, because it leads more directly

to the only object, which enables us to surmount the disgusts inseparable from anatomical researches. That it has not yet been adopted, is owing to this, that to transmit the science in this way, we must find in the same master, a skilful preparer, a person already learned in another method, who, having well seen and cor rectly observed, is endowed with the talent of expressing nature with the nicest art, in making her speak faithfully to the eyes."

PHILADELPHIA ANATOMICAL ROOMS.

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1823-4.

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